**Unit 9 Notes: Organism Form and Function (Maintaining Homeostasis and Responding to Stimuli)**

***Part A: Maintaining Homeostasis***

Ms. Ottolini, AP Biology, 2012-2013

***Directions:*** *Use the links provided on the Wiki page to access each video. Answer the questions below thoroughly and accurately. You do not need to answer in complete sentences, however, please remember that a complete thought often requires a complete sentence!*

**Video #1: Bozeman Biology – Positive and Negative Feedback Loops**

1. What is Mr. Anderson attempting to show you with the “speed indicator machine?” In your own words, what is the difference between a negative and positive feedback loop?
2. What examples in nature does he intend to use to demonstrate negative feedback vs. positive feedback?
3. What example does he intend to use to show how “mistakes” in the body can lead to alteration of feedback loops?
4. How is the way in which a hairless cat (gross) maintains a constant internal environment (homeostasis) different from the method used by a unicellular pond organism (ex: a paramecium – a type of protist)?
5. What is the difference between an ectotherm and an endotherm? What are the advantages and disadvantages of each temperature regulation strategy?
6. ***Negative Feedback:*** When the hypothalamus (a primitive part of your brain) senses that your body has gone above its target temperature, what are three ways in which your body may try to cool itself down?
7. ***Negative Feedback:*** What are two ways in which your body may try to warm itself up? Can you think of a third method that he did not mention?
8. ***Positive Feedback:*** How is fruit ripening an example of positive feedback? Make sure to mention the chemical compound ethylene (C2H4) in your response.
9. ***Positive Feedback:*** How is the onset of labor (childbirth) in humans an example of positive feedback?
10. ***Mistakes in Feedback:*** Where, other than the blood, can glucose be found / used? (Hint: there are two answers!)
11. ***Mistakes in Feedback:*** What are the two functions of the pancreas?
12. ***Mistakes in Feedback:*** What normally happens when beta cells in the pancreas sense high levels of glucose in the blood?
13. ***Mistakes in Feedback:*** What is the function of the hormone insulin in the human body?
14. ***Mistakes in Feedback:*** What normally happens when blood glucose levels are too low?
15. ***Mistakes in Feedback:*** What is the function of the hormone glucagon in the human body?
16. ***Mistakes in Feedback:*** How/why is the blood glucose feedback loop altered in an individual who has type 1 diabetes?
17. ***Mistakes in Feedback:*** How are the causes/mechanisms behind type 2 diabetes different?
18. ***Mistakes in Feedback:*** How do doctors treat diabetes? How does this affect the feedback loop?

**Video #2: Bozeman Biology – Response to External Environments**

1. Why does Mr. Anderson find tardigrades (AKA water bears) to be so interesting?
2. What two types of responses do organisms use to address stimuli in their external environments?
3. What environmental stimulus does he intend to focus on in this video?
4. Which two behavioral responses does he intend to discuss in this video?
5. Which two physiological responses does he intend to discuss in this video?
6. ***Behavioral Response:*** What do “true hibernators” (ex: a groundhog) do to withstand cold winter temperatures?
7. ***Behavioral Response:*** How is daily torpor different from true hibernation?
8. ***Behavioral Response:*** Describe the migration pattern of the bar-tailed godwit.
9. ***Physiological Response:*** How does shivering help to warm the body up?
10. ***Physiological Response:*** How does sweating help to cool the body down?

**Video #3: Bozeman Biology – Plant and Animal Defense (i.e. the Immune System)**

1. What are pathogens? Why types of organisms might be pathogens (use your prior knowledge)?
2. What two types of defense does Mr. Anderson intend to discuss in this video?
3. What are examples of non-specific defenses in humans and plants?
4. What are the two types of specific defenses in humans and how are they different from one another?
5. Explain how the hypersensitivity response in plants helps to protect them from pathogens.
6. Explain the meaning of the following statement: “Specific immune defenses have memory.”
7. What are antibodies and antigens? How are antibodies involved in the development of the smallpox vaccine?
8. What are antigen-presenting cells (APC’s) and how are they related to helper T cells?
9. Why are helper T cells considered the most important cells in the specific immune response?
10. How are plasma B cells and memory B cells different from one another?
11. What is the role of the killer T cell (AKA cytotoxic T cell) in the specific immune response? Is this part of the humoral response or the cell-mediated response?
12. Why is HIV (Human Immunodeficiency Virus) such a difficult virus for our bodies to destroy?